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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/826,127

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Akio Furukawa

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EXAMINER

MILLER, BRIAN E

ART UNIT

PAPER NUMBER

2627

DATE MAILED: 09/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/826,127	<b>Applicant(s)</b> FURUKAWA ET AL.	
	<b>Examiner</b> Brian E. Miller	<b>Art Unit</b> 2627	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 June 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-5, 13 and 14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 13 and 14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. 10/218,247.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

This application is a DIV of 10/218,247 and claims 1-5, 13-14 are now pending.

***Specification***

1. The abstract of the disclosure, filed 6/21/06, is objected to because it appears to be too long, e.g., 240+ words, and should be amended appropriately. Correction is required. See MPEP § 608.01(b).

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1, 3, 5, 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Lin et al (US 6,262,869). Lin et al discloses, as shown in at least FIG. 16, a magnetic head 300 using magnetoresistive effect including: a magnetic sensing portion formed of a magnetoresistive effect element, wherein: the magnetic sensing portion includes a lamination layer structure portion in which at least a free layer, i.e. sense layer, 304 made of a soft magnetic material of which the magnetization is rotated in response to an external magnetic field, a fixed layer, i.e., reference layer, 306 made of a ferromagnetic material, an antiferromagnetic layer (pinning layer 308) for fixing the magnetization of the fixed layer and a spacer layer 302 interposed between the free layer 304 and the fixed layer 306 are laminated with each other (see paragraph (24)); the

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lamination layer structure portion further includes a magnetic flux introducing layer (one of keeper layer 320 or free layer 304) of which the tip end is opposed to a surface which is brought in contact with or opposed to a magnetic recording medium 34 (see FIG. 2); the lamination layer structure portion has at its lamination layer direction opposing side surfaces (344, 346) formed of one flat surface or continuous one curved surface over at least the free layer, the spacer layer and the fixed layer, as shown in the figure (also see FIG. 19I); a hard magnetic layer 348, 350, having high resistance or low resistance for maintaining a magnetic stability of the free layer is disposed in direct contact with the opposing surfaces (see paragraph 26); a sense current " $I_s$ " for the lamination layer structure portion flows through the lamination layer direction of the lamination layer structure portion, as known in the art; and an external magnetic field is applied to the direction extended along the plane direction of the lamination layer structure portion and which is extended substantially along the opposing side surfaces (as shown in FIG. 11 for example, and col. 12, lines 23+); (as per claim 3) wherein the spacer layer 302 is formed of a nonmagnetic conductive layer (see col. 10, lines 19-20); (as per claim 5) wherein the hard magnetic layer 348/350 and the free layer 304 are disposed in such a manner that a central portion in the thickness direction of the hard magnetic layer "substantially agrees" with a central portion in the thickness direction of the free layer, in so far as this has been defined in the claim; (as per claim 6) wherein either one of the keeper layer 320, or alternatively, the free layer 304, can be read as the "magnetic flux introducing layer" as claimed.

As claim 13 has similar limitations as claim 1, it is rejected under the same grounds.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 2, 4, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al.

For a description of Lin et al, see the rejection, supra.

Lin et al teaches substantially all of the limitations of claim 2 except for a second of each a fixed, free, and fixing layer added to the lamination. Official Notice is taken, however, that such GMR sensors, commonly known as dual spin valve sensors, include two each of the aforementioned layers and are notoriously old and well known in the art. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have provided the GMR sensor of Lin et al with a second free, pinned and pinning layer, as known in the art in order to provide a substantially larger GMR response, as was conventionally known in the art.

Further, with respect to claim 4 and the spacer layer being made of a tunnel barrier layer, while Lin et al does not disclose the spacer layer being a "tunnel barrier layer", Official Notice is taken that changing the characteristics of the spacer layer 302, as known in the art, would have resulted in a tunneling effect, e.g., the current going perpendicular through the lamination, i.e., opposite

to that as presently taught by Lin et al. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the characteristics of the spacer layer of Lin et al to have provided a “tunneling effect”, as being an obvious equivalent to the spacer layer as taught by Lin et al, as known in the art. The motivation would have been: lacking any unobvious or unexpected results, modifying the spacer layer to have a tunneling effect, would have resulted through routine engineering optimization, as either type of spacer, was conventionally known in the art.

### ***Response to Arguments***

6. Applicant's arguments filed 6/21/06 have been fully considered but they are not persuasive.

A...Applicants' sole assertion is that “Lin et al. does not disclose or suggest a sense current for the lamination layer structure portion that flows through the lamination layer direction of the lamination layer structure portion, where the lamination layer structure portion has at its lamination layer direction opposing side surfaces formed of one flat surface or continuous one curved surface over at least the free layer, the spacer layer and the fixed layer, as required by claim 1. Rather, in Lin et al., the sense current  $I_s$  flows perpendicular to this direction, i.e., from left to right in Fig. 11. (See col. 7, lines 18-19 and 43-45).”

In response, the Examiner considers the teachings of Lin et al to read on the present claim language. The language “a sense current for said lamination layer structure portion flows through the lamination layer direction of said lamination layer structure portion” does not actually define any specific direction for the sense current, i.e., perpendicular or parallel, as the

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claim merely calls for a “lamination layer direction” which does not set forth any real direction. It has been interpreted that the sense current does indeed “flow[s] through the lamination layer direction of said lamination layer structure portion” as described above, in so far as it has been particularly set forth in the claim(s).

It is noted that, although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

### ***Conclusion***

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian E. Miller whose telephone number is (571) 272-7578. The examiner can normally be reached on M-TH 6:30am-4:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (571) 272-7579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>.

Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



**Brian E. Miller**  
**Primary Examiner**  
**Art Unit 2627**

BEM  
August 29, 2006